

V. Monitoring and Evaluation Requirements

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CHAPTER V. MONITORING AND EVALUATION

Monitoring and evaluation will compare the results being achieved by the forest plan to the results projected. This will provide for orderly and timely amendments and revisions of the forest plan if needed. More specifically, the objectives of monitoring and evaluating are to determine if:

- Planned output levels are being achieved.
- Environmental quality standards are being achieved.
- Programmed practices and activities are being implemented.
- Management direction is being followed.
- Management direction is achieving the desired management results.
- Resource information used in projecting outputs and impacts of management was accurate.
- Budget levels are consistent with the management intensity projected.
- Estimated costs and benefits used in analysis and development of the forest plan are accurate.
- New information is needed for forest plan revision.

A. Levels of Monitoring and Evaluation

Three levels of monitoring and evaluation have been defined for the LTBMU (FSH 1909.15 NEPA Procedures, LTBMU Supp. 1/6/82). They are:

1. Project Level: Responsible staff and project supervisors will monitor the actions occurring on each project or activity to ensure implementation is in accordance with established standards, Forest Service manuals and handbooks, and in project level environmental assessments, EIS's, or plans.
2. Annual Program Level: Output and cost objectives will be monitored through the annual attainment reporting and unit objectives review process. The quality of the annual program accomplishment will be measured through on-the-ground review of selected projects by a team of specialists assigned annually by the Forest Supervisor. This review will consider whether management practices are being applied to the proper standards.
3. Forest Plan Level: Monitoring established in this forest plan to measure the cumulative achievement of many actions.

Monitoring results will be compiled periodically and the results of monitoring and evaluation will be reported.

LTBMU Forest Plan

B. TRPA Monitoring

The Tahoe Regional Planning Agency is developing an intensive monitoring plan and program for the **Lake** Tahoe Basin. It is designed to measure the effects of all activities in the basin, including those on national forest land, upon the achievement of the TRPA thresholds. Cooperation from many agencies will be necessary to carry out the monitoring. For example, water quality monitoring being conducted by the Forest Service will be linked to that occurring on private land and within the waters of Lake Tahoe to evaluate the overall effectiveness of the Water Quality Plan (208) for the basin. Combining the resources of many agencies will allow a much more thorough monitoring of the environment with greater efficiency than could be accomplished by the individual agencies. The LTBMU will participate in the development of the monitoring plan with the TRPA. Some examples of activities, practices, and effects that would best be monitored through the basinwide effort are noise, air quality, most elements of water quality, cumulative effects of management practices on soil and watershed conditions, instream flows, and fishery habitat maintenance and improvement.

C. Monitoring Plan

Resource management practices, activities, and effects to be monitored are displayed in Table V.1. Data sources, the reliability of the data, and the frequency of monitoring are also shown for each monitoring activity, practice, or effect. The monitoring plan is comprised of a number of components (columns). These components are described as follows:

<u>Column Number</u>	<u>Component Name</u>	<u>Description</u>
1	Identifier	The item to be monitored is identified.
2	Activity, Practice, or Effect to be Measured	The specific items that respond to either NFMA, ISM 1920, forest plan direction, local, or subsequent project needs. This activity, practice, or effect is a specific statement of what will be monitored. These items allow the LTBMU to evaluate the consequences of actions and outputs; e.g., trends of soils and vegetation for range by measuring vegetative composition, density, and vigor.
3	Monitoring Objective	Specific statement of what will be monitored (activity, effect or practice) and what is intended to be accomplished.
4	Monitoring Techniques	The description of the specific sampling or inventory techniques and the sources of information to be used.

5	Expected Precision/ Reliability (validity)	This is the exactness or accuracy of the measurement technique and the expected probability that the information acquired through monitoring reflects the actual conditions. Both precision and reliability (validity) are qualitatively rated as either high, moderate, or low.
	<u>Level of precision/validity</u>	<u>Accuracy limits</u>
	high	maximum measurement of $\pm 10\%$ of the sample mean
	moderate	maximum measurement of $\pm 33\%$ of the sample mean
	low	maximum measurement of $\pm 50\%$ of the sample mean
	N/A	accuracy limits cannot be established
6	Minimum Monitoring Frequency	Describes how often the activity, practices, or effect is sampled.
7	Reporting Period	The frequency of recurring intervals between reports summarizing monitoring results for a specific activity, practice, or effect.
8	Standards	These are the tolerance limits or standards by which the activity, practices, or effect will be evaluated.
9	Who is responsible for doing the monitoring?	For each activity, practice, or effect to be monitored, the individual responsible is identified.
10	Variability from Standard Indicating Further Action	This is the criteria describing the tolerance limits or standards from which the activity, practice, or effect can vary from predicted performance. When these limits are exceeded, further evaluation and monitoring is initiated.
11	Average Annual Cost	This is the best estimate of the average annual monitoring cost based on the requirements in the forest plan for the first five years.

D. Reporting the Results of Monitoring

Results of monitoring and evaluation will be reported on a fiscal year basis. This report will summarize the accomplishments for the previous year. When monitoring results are reported, their significance will be evaluated. Figure V.1 illustrates the monitoring and evaluation decision process.

Based on the evaluation, any need for further action is recommended to the Forest Supervisor. See Table V.1 for variability for each activity, practice, or effect to be measured which would initiate further action. The recommendations can include:

- No action needed: monitoring indicates goals, objectives, and standards are achieved.
- Refer recommended action to the appropriate line officer for deletion, modification, or revision of management area prescriptions.
- Modify the management prescription as a forest plan amendment.
- Initiate revision of the forest plan.
- Modify the allocation of a prescription as a forest plan amendment.
- Revise the projected schedule of outputs.

E. Revisions or Amendments Resulting from Monitoring and Evaluation

NFMA requires that the forest plan be evaluated every five years to see if it is still applicable and appropriate. The monitoring requirements include a yearly monitoring report discussing the status of the plan.

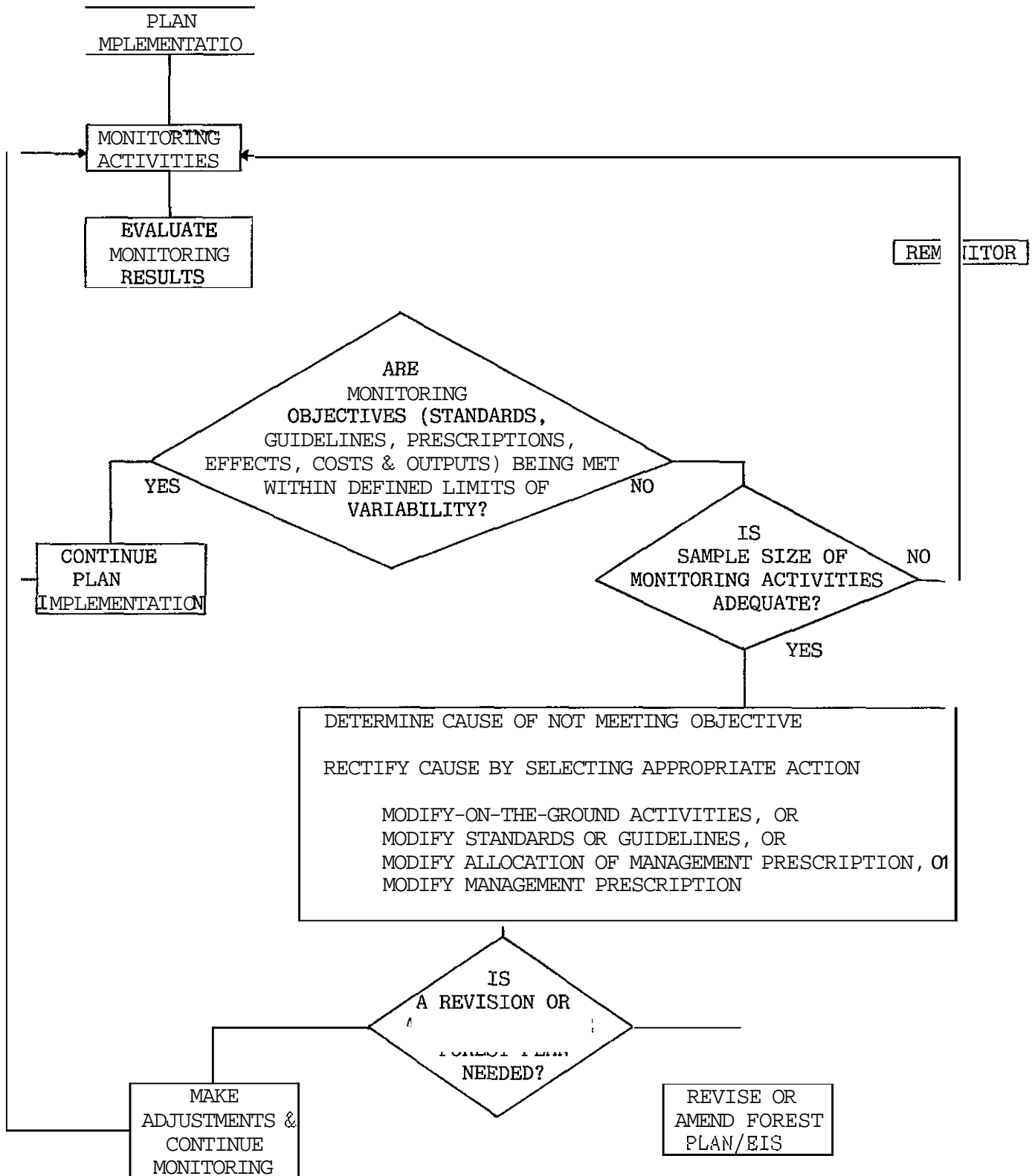
Factors that could cause the forest plan to be revised or amended are:

- a. changes in demand
- b. changes in physical or biological conditions
- c. changes due to legislative action
- d. changes due to national emphasis as reflected in program funding
- e. failure to achieve the environmental thresholds

NFMA (219.10) defines amendments and revisions as follows:

“Amendment. The Forest Supervisor may amend the forest plan. Based on an analysis of the objectives, guidelines, and other contents of the plan, the Forest Supervisor shall determine whether a proposed amendment would result in a significant change in the plan. If the change resulting from the proposed amendment is determined to be significant, the Forest Supervisor shall follow the same procedure as that required for development and approval of the plan. If the change resulting from the amendment is determined not to be significant for the purposes of the planning process, the Forest Supervisor may implement the amendment following appropriate public notification and satisfactory completion of NEPA procedures.”

Figure V.1. Monitoring Process Flow Chart



"Revision. A forest plan shall ordinarily be revised on a 10-year cycle or at least every 15 years. It also may be revised whenever the Forest Supervisor determines that conditions or demands in the area covered by the plan have changed significantly or when changes in RPA policies, goals, or objectives would have a significant effect on forest level programs. In the monitoring and evaluation process, the interdisciplinary team may recommend a revision at any time. Revisions are not effective until considered and approved in accordance with the requirements of the development and approval of a forest plan. The Forest Supervisor shall review the conditions on the land covered by the plan at least every 5 years to determine whether conditions or demands of the public have changed significantly."

In summary, an amendment is a change which may or may not be determined to be significant according to NEPA (40 CFR 1508.27). A revision is usually determined to be necessary by the Forest Supervisor because conditions or demands have changed significantly, or occurs when other higher-level direction has a significant effect on programs. Revisions are not effective until all requirements are followed for development and approval. Amendments and revisions are the results of the monitoring and evaluation process.

Table V 1a Monitoring Plan

ACTIVITY PRACTICE OR EFFECT TO BE MEASURED	MONITORING OBJECTIVE	MONITORING TECHNIQUES	EXPECTED PRECISION RELIABILITY	MINIMUM MONITORING FREQUENCY	REPORTING PERIOD	STANDARDS	RESPONSIBILITY	VARIABILITY FROM STANDARD INDICATING FURTHER ACTION	AVERAGE ANNUAL COST
1 Planned output levels are being achieved	Determine if the actual annual, outputs of goods and services are meeting those projected in the plan	Compare management attainment report with objectives table in forest plan	N/A	Annual	Annual	None	LMP Staff	+ 20% from predicted level of major element would require evaluation of long term cumulative effects	\$500
2 Costs per unit of output	Maintain cost efficiency	Compare actual average annual cost per unit of output with that used in the plan development	Mod	5 years	5 years	None	All Staff	+ 10% in a major element of output	\$500
3 Public issues	Determine if the public issues have been resolved through the forest plan	Review of letters, meeting comments, and other communications with the public, permittees, agencies, etc	Low	Continuously	Periodically	Public should be supportive rather than disruptive of programs	Forest Supervisor	Sensing of public indicates unacceptable response to all or portions of the plan	\$1,000
4 Visual condition of forest	Determine if VQO are being met	Field observation and photo point method to determine if objectives are met	High	Project review	Annual	Visual Resource Handbooks	Recreation Staff	Failure to achieve VQO	\$500
5 Effects of OHV use	Determine if use of vehicles is following the standards established for travel in the basin and not creating excessive resource damage	Review results of TRPA road and recreation site scenic evaluation	High	5 years	5 years	TRPA visual study	Recreation Staff	Ratings trending away from improvement	\$50
		Observation of vehicle use, or evidence of vehicle use Review of enforcement action	Low	Continuously	Annual	Forest Standards and Guidelines, Environmental Thresholds	Recreation Staff	Vehicles violating travel requirements to the extent that resource damage occur or noise standards are determined to be exceeded	\$500
6 Threatened, Endangered and Sensitive plant species protection	Determine change in populations of these plants	Inventory known habitat sites for changes in number and vigor of plants	Mod	Annual	Annual	FSH 2609 25	Wildlife Staff	To be determined since populations fluctuate considerably	\$2000
7 Threatened and endangered species coordination	Ensure coordination occurs with external entities	Conduct interagency meetings	High	Annual	Annual	N/A	Wildlife Staff	N/A	\$1,000
8 Wintering bald eagles	Evaluate trend of habitats delineated to meet recovery goals Determine trend of winter populations	Coordinate winter bald eagle roost site survey with USF and WS Survey sample habitats as designated by CDFG Survey capability of delineated habitats	High Mod High	1 to 2 days each yr Specific project review	Annual monitoring and 5 yr trend analysis	USFWS bald eagle recovery plan HCMS, FWS&G	Wildlife Staff	+or- 25% annual change in population level Any decline in a sample of territories over a 3 yr period	\$600
9 Bald eagle breeding	Determine trend of breeding populations Evaluate trend of habitat delineated to meet recovery plan objective	Reproductive survey of occupied & potential habitats Survey habitat capability of occupied & potential sites	High High	Annual Specific project review	Annual Annual	USFWS Recovery Plans, HCMS & FWS&G	Wildlife Staff	Loss of 1 breeding pair will trigger an evaluation	\$400/pair

TABLE V 1b Monitoring Plan

ACTIVITY PRACTICE OR EFFECT TO BE MEASURED	MONITORING OBJECTIVE	MONITORING TECHNIQUES	EXPECTED PRECISION RELIABILITY	MINIMUM MONITORING FREQUENCY	REPORTING PERIOD	STANDARDS	RESPONSIBILITY	VARIABILITY FROM STANDARD INDICATING FURTHER ACTION	AVERAGE ANNUAL COST
10 Goshawk	Insure project compliance with regional S & G Determine population and habitat trends in designated areas	Survey of designated habitats to determine occupancy & habitat capability	Low/Mod High	Specific project EA & post project +25% of active sites/yr	Annual	HCMS, Regional MMR, FWS&G	Wildlife Staff	Declining trend in population	\$2,000
11 Peregrine falcon re-establishment	Ensure restoration at least 1 breeding pair on the forest Certify nesting & reproductive success of Peregrine falcon	Field surveys of adults & young, all occupied and high potential sites	Mod/High	Monthly progress reports during breeding and hatching each year	Annual monitoring and 5-year evaluation	Success rates of other similar sites within the State Data from SCPBRG	Wildlife Staff	Greater loss of birds than average Statewide program	\$2,000
12 Population trends of management indicator wildlife and fish species	Determine trends in MIS species	Field observation of indicators of wildlife and fish	Mod	Annual	5 years		Wildlife Staff	Declining Trend in population	\$1,000
13 Population trend of riparian bird assemblage	Evaluate habitat capability for terrestrial wildlife in riparian zones	Point counting of birds	High	Annually	Annually	Baseline population trends	Wildlife Staff	20% decline from baseline populations	\$5,000
14 Achievement of the goals for vegetation diversity	Determine the trend in vegetation diversity by measuring the rate of change induced through vegetation alteration practices	Compare actual vegetation changes produced through timber management, wildlife management, natural fire, and disturbed land restoration projects	Mod	5 years	5 years	Ensure that diversity is maintained or enhanced	Wildlife Staff	Trend toward less diversity	\$500
15 Suitability for timber production	Determine if land now classed as unsuitable for timber production becomes suitable	Review of changes in timber prices and cost of sale preparation and administration	Mod	5 years	5 years	Actual price and cost data	Timber Staff	Sufficient changes in values to consider economic suitability	\$300
16 Forest pest damage.	Early detection, and evaluation of pest related problems	Aerial and ground surveillance for tree damage, beaver activity, rodent die-off, and other indicators of problems	Mod	Annual or as needed	Annual or as needed	Pest damage is maintained at a level that meets health and safety and attainment of goals	Timber Staff Recreation Staff FPM-RO	Pest related damage above that determined tolerable	\$500
17 Maintenance or improvement of water quality	Assess compliance with BMP direction	Review of EAs and contract provisions and field activity	High	Ongoing	Annual	Forest standard and guidelines, TRPA handbook of BMP	Water-shed Staff	No tolerance for lack of BMP	\$1,000
	Evaluate the effectiveness of Best Management Practices in mitigating water quality impacts (Range, timber sales, recreation ski areas, OHV use, and watershed restoration areas are examples)	Measuring the chemical and physical properties of water samples as described in the LTBMU Water Quality Monitoring Plan as amended annually by the Water Quality Monitoring Program	High	Monthly or more often during runoff events	Annual	Laboratory standards established by USGS, EPA and Public Health Service	Water-shed Staff	No tolerance for variation in sampling techniques Success or failure of BMP to meet expected remedial actions will determine future use of the practices	\$60,000

TABLE V 1c Monitoring Plan

ACTIVITY PRACTICE OR EFFECT TO BE MEASURED	MONITORING OBJECTIVE	MONITORING TECHNIQUES	EXPECTED PRECISION RELIABILITY	MINIMUM MONITORING FREQUENCY	REPORTING PERIOD	STANDARDS	RESPONSIBILITY	VARIABILITY FROM STANDARD INDICATING FURTHER ACTION	AVERAGE ANNUAL COST
18 Land Disturbance	Identify the net change in impervious coverage and land disturbance with special emphasis on SEZ	Estimate the square footage of impervious coverage added and removed by projects and restoration work. Estimate the acreage of new disturbance, re-covering disturbance and restored disturbance	Mod	Annual	Annual	Use TRPA guides for impervious coverage determination and disturbance recovery rates developed for the forest plan	Watershed Staff	Impervious coverage greater than system allows by parcel or watershed. Total disturbance restoration rate, especially for SEZ, not meeting TRPA goal	\$2,000
19 Development rights compliance on lots acquired in the Santini/Burton program. Also prevent soil and vegetation disturbances or other water quality impacts on these lots	Identify violations in purposes for which land was acquired	Field observation for unauthorized activities or unnatural watershed degradation	High	1/3 of parcels annually	Annual	As stated in the Act and in deed restrictions	Lands Staff	No variation accepted	\$1,500 increasing to \$7,000 in 10 years
20 Effect of management activity caused disturbance upon top soil depth	Evaluate whether top soil loss is within acceptable limits at selected sites	Field observation and review of existing data including groundcover transects and soil density measurements	Mod	Annual	Annual	Soil loss not to exceed 1 ton/acre/yr	Watershed staff	15% of sampled sites resulting in unacceptable loss	\$2,000
21 Fire management effectiveness	Determine if fire organization and strategy is meeting targets	Compare acres of actual burn with predicted burn	Mod	Annual	Annual	FSH 5109 19	Fire Staff	> 35% difference between actual and predicted FMEI	\$200
22 Cumulative effects of forest activities upon air quality	Determine if the tonnage of slash burned each year is as predicted	Field estimate amount accumulated in activity areas and the % disposed of through burning	Mod	Annual	5 years	Predicted =180 TPM @ 42 lbs per ton of slash burned	Fire Staff	Annual estimates regularly exceeded that which was predicted for the 5 year period or one year exceeded predicted by 25%	\$500
	Determine if total vehicle miles traveled (VMT's) are being reduced in the basin as a result of traffic mitigation measures being employed	Cooperate with TRPA in analyzing average daily trip data and other performance measures	Mod	Annual	Annual	TRPA QRS model, CalTrans VTPS model	Planning Staff	N/A	\$500
23 Noise management	Determine if activities on national forest land are within human and animal tolerance levels	Cooperate with TRPA and other agencies in the use of single and cumulative noise event levels at selected locations	High	Based upon planned use of available equipment	Annual	TRPA Thresholds	Planning Staff	Single event thresholds are exceeded Cumulative event thresholds are exceeded as a result of activities on national forest	\$800
24 Building Operations	Ensure safe, usable buildings for the public and for employees	Inspections	High	Annual	Annual	FSH	Engineer Staff	Unsafe conditions will be immediately corrected or the use terminated	\$2,000

TABLE V 1d Monitoring Plan

ACTIVITY PRACTICE OR EFFECT TO BE MEASURED	MONITORING OBJECTIVE	MONITORING TECHNIQUES	EXPECTED PRECISION RELIABILITY	MINIMUM MONITORING FREQUENCY	REPORTING PERIOD	STANDARDS	RESPONSIBILITY	VARIABILITY STANDARD FURTHER ACTION	PROM: INDICATING ACTION	ANNUAL COST
25 Compliance with Safe Drinking Water Act	Ensure safe drinking water	Determine drinking water quality by sampling and testing	High	FSM 7420	FSM 7420	FSM 7420 and 7409 11	Recreation Staff	Deviation standards in FSM		\$5,000
26 Road operations	Ensure facilities support forest objectives and protect users and resources	Determine road management objectives, and establish system operation standards	Mod	Annual	Annual	Guidelines in FSH	Water-shed Staff	No deviation tolerance established yet		\$2,000
27 Landline location	Assure landlines are established before projects are implemented	Review of LLL schedule	High	Annual	Annual	Public Survey Standards	Lands Staff	Lack of LLL holds up projects		\$100
28 Rights-of-way acquisition	Determine if rights-of-way are acquired to provide access to national forest	Review of rights-of-way acquisition schedule	High	Annual	Annual	ROW Action Plan	Lands Staff	Lack of R-O-W public access when desired		\$100
29 Land adjustment	Assure rate of acquisition or adjustment is meeting Forest Service objectives	Review of adjustment schedule	High	Annual	Annual	Completed adjustment program in 15 years	Lands Staff	Schedule lags by 20%		\$200
30 Protection of cultural resources	Ensure cultural resources are considered prior to all forest undertakings	Archaeological reconnaissance report	High	As needed	Annual	All sites identified	Recreation Staff	No tolerance for variation from standards		\$20,000
	Apply criteria of evaluation of the National Register of Historic Places to determine significant cultural properties	Field visitation SHPO-NRHP consultations	High	As needed	Annual	All sites evaluated prior to impacts	Recreation Staff	No tolerance for variation from standard		\$10,000
	Implement protective and mitigative measures designed to alleviate impacts to cultural resources	Administrative directives ACHP consultation	Mod	As appropriate	Annual	All significant or potentially sig sites protected or impacts mitigated	Recreation Staff	No tolerance for variation from standard		\$6,000
	Ensure effectiveness in utilizing and interpreting cultural resources for public benefit	Observe visitor use and scientific research utilization	High	As appropriate	Annual	Sites are not degraded/ research is professional addidownmeben	Recreation Staff	Loss of values which contribute to the significance of property		\$3,000
							reports			